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The operational environment continues to expand as more elements requiring consideration grow in importance and interaction. A specific element that operational planners must consider when assessing political and military objectives of belligerents, and how those objectives may shape military operations, is water as a natural resource. This paper defines water as a resource and then examines two regions having water scarcity affecting inter-state relations to include affecting military objectives and operations. This examination highlights specific concerns to the operational planner and recommends techniques to incorporate water when analyzing the operational environment.

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Conflicts Over Water as a Resource

by

James Cooksey
Major, USMC

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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23 April 2008

Abstract

The operational environment continues to expand as more elements requiring consideration grow in importance and interaction. A specific element that operational planners must consider when assessing political and military objectives of belligerents, and how those objectives may shape military operations, is water as a natural resource. This paper defines water as a resource and then examines two regions having water scarcity affecting inter-state relations to include affecting military objectives and operations. This examination highlights specific concerns to the operational planner and recommends techniques to incorporate water when analyzing the operational environment.

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He it is Who sends down water from the cloud for you; it gives drink, and by it the trees upon which you pasture.

Qur'an, 16:10

As the military operational level of war grows increasingly interwoven with the other elements of national power, is filtered through a larger number of both foreign and domestic media outlets (and filtered faster), and carries effects far past military-only considerations, operational planners must consider a wider range of factors concerning the operating environment, populations, political concerns, etc. One example of how the Department of Defense is dealing with this expanding environment is by establishing Standing Joint Force Headquarters (SJFHQ) within each Combatant Command. These SJFHQ have a specific regional focus and allow assigned planners to more closely focus on factors that have the potential to affect operational planning within that region. Thorough familiarity with the factors driving political and military decisions in the region makes for more effective operational planners.[1] In Central Command and the recently established Africa Command, a specific factor operational planners must become familiar with, and consider how it will affect political and military objectives and actions, is water.

Military operational planning currently considers water requirements for personnel and equipment such as usage rates, transportation requirements, and processing and filtering methods. Water as a part of factor space inhibiting or enabling movement is similarly specifically considered in operational planning. Yet water's significance may still be overlooked because, as any fourth-grade science student can attest, water is ubiquitous, essential, and fundamental to life on Earth. Equally important, water has no substitute.

This paper examines water's effects on conflict as a required, but often scarce, resource. The examination begins by considering sources of conflict between states and how

[1] Bennett, "DOD Puts JFCOM Standing Joint Force Headquarters on Fast Track."

resources affect conflict. The examination continues by looking at two different situations where water is a significant factor to conflict: 1) disputes between Turkey, Syria, and Iraq over the Tigris and Euphrates Rivers and 2) disputes between Israel and its neighbors Jordan, Syria, Lebanon, and the Palestinian territories. As noted above, operational planners must understand how water as a resource affects political and military decision making in order to accurately and effectively assess objectives and actions as part of operational planning.

Resources as Cause for Conflict

> Economists and other social scientists who seek the sources of human behavior in material conditions tend to attribute much of the world's collective violence to conflicts over highly valued resources, especially in zero-sum situations, where one group's getting what it wants diminishes another group's ability to satisfy its wants. The situations of this sort most conducive to violence include severe scarcities of the resources that the basic subsistence of a community requires.[2]

Renewable and Nonrenewable Resources

The above quote from Seyom Brown succinctly captures the conditions by which resources prompt conflict. These conditions are most readily seen when considering the quintessential nonrenewable resource, territory. Paul Senese argues, "domestic populations are more concerned with preserving the integrity of land and more willing to fight in defense of it than in defense of an ideological or policy stance."[3] Senese continues by asserting that a state's leadership will place a high priority to any threat to territory and be more willing to use military force against such a threat. It is relatively easy to see the linkage between territory and the continuing existence of a state. Losing its physical territory, a state simply

[2] Brown, *The Causes and Prevention of War*, 31.
[3] Senese, "Territory, Contiguity, and International Conflict: Assessing a New Joint Explanation," 771.

ceases to be. However, other nonrenewable resources are almost equally requisite for a state's successful existence in order to sustain its economy, to employ its population, and to feed the same. Ideally, these resources are within a state's borders. Often they are not.

Wars over access to nonrenewable resources are explained when states, as rational actors, calculate the costs of war versus insufficient access to needed resources. Thomas Homer-Dixon offers examples as "during World War II, Japan sought to secure coal, oil, minerals, and other resources in China and Southeast Asia; Hitler's forces were on their way to seize the Caucasian oil fields when they were stopped at Stalingrad in 1942; and the 1991 Gulf War was at least partially motivated by the desire for oil."[4] However, Homer-Dixon discounts the idea of armed conflict breaking out over *renewable* resources. His research indicates no correlation between renewable resources and violent conflict – though, he admits, competition for renewable resources may significantly aggravate already poor inter-state relations.[5]

If Homer-Dixon represents conventional thinking which defines water as a renewable resource, and in line with the discussion to this point, water could be contributory to a conflict but not a *casus belli* in of itself primarily because rational calculations do not support going to war over renewable resources. The benefits of capturing renewable resources are much more slowly realized than when capturing nonrenewable resources.[6] However, the conclusion that water affects conflict in the same manner as other renewable resources ignores the fourth-grader's recognition of water's fundamental and irreplaceable role to life. Considering water as simply another renewable resource ignores the idea that while water remains a renewable resource on a global scale, regional scarcity coupled with usage

[4] Homer-Dixon, *Environment, Scarcity, and Violence*, 137.
[5] Nichiporuk, *The Security Dynamics of Demographic Factors*, 38.
[6] Homer-Dixon, *Environment, Scarcity, and Violence*, 138.

exceeding replacement, further exacerbated by concentrated and growing populations' demands, force water to exhibit the characteristics of a nonrenewable resource of finite availability. Thus, in regions subject to these conditions (primarily in Central Command's and Africa Command's AORs) water must be considered as a *nonrenewable* resource and a significant potential source of conflict.

Water as a Source of Conflict

"Water is a critical resource for personal and national survival, it is essential to the production and use of military power, and rich countries are as dependent on water as poor countries."[7] Water's criticality rises from basic human need for sustenance and expands from society's needs for growth, economic viability, and self-protection. Frederick Frey states it best, "Water has four primary characteristics of political importance: extreme importance, scarcity, maldistribution, and being shared. These make internecine conflict over water more likely than similar conflicts over other resources." [8] Because of water's irreplaceability, states react vigorously to even perceived scarcity.[9] These reactions tend to increase maldistribution and reduce the chance for cooperative sharing of water as states enact beggar-thy-neighbor policies seeking self-sufficiency through protecting water resources, imperialistic expansion to gain control of additional water resources, and military actions supporting all.[10]

Expanding populations put increasing pressure on limited water resources. A generally accepted minimum per capita figure for individual water consumption is one cubic meter (m^3), or 1000 liters. However, this figure only considers water directly consumed by

[7] Homer-Dixon, *Environment, Scarcity, and Violence*, 139.
[8] ITT Industries, "ITT Industries Guidebook to Global Water Issues."
[9] Kemp, "Scarcity and Strategy," 399.
[10] Brown, *The Causes and Prevention of War*, 32.

the individual. A generally acknowledged figure of "acceptable quality of life" per capita water usage is 1000 m^3 and may be lowered to as little as 500 m^3 with the application of sophisticated water management policies.[11] As a comparison, 2005 U.S. per capita water *usage* was 1911 m^3 out of per capita water *availability* of 10,060 m^3.[12] Table 1 depicts water *availability* and population projections for those states surrounding the Jordan River. When considering these figures, it is critical to note that, with the exception of Lebanon, these states' usage already exceeds sustainable availability.[13]

Table 1. Per Capita Water Availability
(Population in Thousands, Water in Cubic Meters per Year)

	Israel		Jordan		Lebanon		Syria	
Year	Population	Water	Population	Water	Population	Water	Population	Water
1955	1,748	1,230	1,447	905	1,613	3,087	3,967	6,501
1990	4,821	461	4,259	308	2,555	1,949	12,348	2,089
2025	8,366	247-303	9,369	104-114	5,621	1021-1248	27,165	713-835
2050	12,549	192-300	11,500	68-90	8,431	768-1218	40,747	454-667

Adapted from Kiser

While not purely a Malthusian situation, population pressure, as indicated in Table 1, makes water an even scarcer, and more critical, resource. As this pressure mounts, "perceived scarcity" becomes even more acute as actual scarcity causes observable hardships or forces undesired changes to behaviors. Whether perceived or real, scarcity of this indispensable resource with no substitute thus becomes likely to precipitate violent conflict for its control. Conversely, control of water provides a state a coercive "resource weapon" to be used militarily, economically, or diplomatically against another state. In either case, water is an important strategic and operational consideration in future conflicts.

[11] Alqallaf, "Water Resources and Security Issues in the Middle East: The Next Arena of Future Conflicts," 9.
[12] ITT Industries, "ITT Industries Guidebook to Global Water Issues."
[13] Kiser, *Water: The Hydraulic Parameter of Conflict in the Middle East and North Africa*, 13. Usage exceeding availability occurs as more water is removed from reservoirs and aquifers than is replenished in a given year. This situation is another contributing factor as to why water should be considered a finite nonrenewable resource in water-poor regions such as the states discussed.

Could a Change in Water's Uses be a Means to Avoid Conflict?

From a global standpoint, fresh water's uses are: 73 percent for irrigation and agriculture, 21 percent for industry, and 6 percent for personal use. However, two key points regarding agricultural water use require greater granularity for this discussion. First, developing nations use up to 90 percent of their water for agriculture. Second, as nations develop, agricultural water requirements tend to rise exponentially because more proteins are added as dietary standards and expectations rise.[14]

In many of the states with water scarcity, there is also a national policy for self-sufficiency in agriculture in order to remove food as a strategic vulnerability.[15] Accompanying these policies, a large quantity of subsidized water is required to make agriculture practical. However, such policies lead to remarkably inefficient use of water as a limited resource. In general, a ton of water used for agriculture adds approximately $1000 to a state's GNP while the same ton of water used for industrial purposes adds $14,000.[16] If a state were to forgo a policy of self-sufficiency in food and instead use water for industrial purposes combined with buying and importing food with a portion of the increased GNP, the state would gain a large quantity of *virtual water* embedded in the food which was produced using another region's water resources. However, despite the rational economic argument, states are unwilling to risk losing self-sufficiency in such a vital area as being able to feed their populace.

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[14] Butts, "The Strategic Importance of Water," 69. The seeming discrepancy between more developed nations using less water but developing nations requiring more water for agriculture as they develop is explained by two factors. The first is that more developed nations tend to use water much more efficiently in agriculture and produce significantly higher yields per unit of water. Thus, despite having higher dietary standards, overall agricultural water usage drops significantly. The second is that more water is required per unit of food as developing nations' diets move from an almost strictly plant-based diet to one with significant amounts of protein.

[15] Kiser, *Water: The Hydraulic Parameter of Conflict in the Middle East and North Africa*, 19.

[16] Alqallaf, "Water Resources and Security Issues in the Middle East: The Next Arena of Future Conflicts," 11.

A combination of water conservation and increased efficiency could reduce water's potential to spark conflict. Absent other environmental and societal factors, states would rapidly implement improvements in these two areas. However, the environmental and societal factors typical in states with water scarcity do not lend themselves to either market or technological improvements to water usage. Homer-Dixon describes it best, asserting such states have great difficulty reforming their policies or procedures because of the "complex, fast-moving, and interacting" nature of resource scarcity.[17] He continues by saying that such a situation may "drive societies into a self-reinforcing spiral of violence, institutional dysfunction, and social fragmentation." These states' remedial efforts thus perpetually lag the growing problems of water scarcity.

A third related change to water usage reducing the potential for conflict would be treating water as a commodity. In this manner, market and technological forces would better respond to demand signals and provide sufficient incentives for these states to more rapidly and more effectively produce solutions to water scarcity.[18] However, this change is inhibited by two factors. The first is the lack of effective institutions required to develop and implement effective responses. (Of note, Israel does possess effective institutions but this positive is outweighed by an unwavering policy of self-sufficiency in food production.) The second is a widely held religious and cultural belief in Islamic states that water is a "cost-free commodity" that cannot be bought or sold.[19] Thus, solutions to water scarcity must be socially acceptable but often turn out to be equally economically detrimental and prevent incentives' effects.

[17] Homer-Dixon, *Environment, Scarcity, and Violence,* 5.
[18] Ibid., 31.
[19] Alqallaf, "Water Resources and Security Issues in the Middle East: The Next Arena of Future Conflicts," 18.

A policy of self-sufficiency in food production, a lack of or inability of effective institutions to deal with water scarcity, and societal factors all combine to make changes in water usage unlikely as a means to reduce potential conflict.

Could International Water Law be a Means to Avoid Conflict?

Unlike the well-defined rights of navigation, international law does not provide any similarly well-defined tenets assisting in avoiding conflicts over water usage. As it currently exists, international law has two basic positions on riparian rights. [20]

The first position is "absolute state sovereignty." This position holds that a state can do as it pleases with any water within its borders, both surface and subsurface, without regard to downstream nations. The second position is "absolute integrity" which holds that there must be an equitable distribution of waters between upstream and downstream states and that the upstream state has an obligation to preserve the quality and quantity of water available downstream.

As might be easily concluded, states' outlooks on these two positions correspond to whether they sit upstream or downstream.[21] With this fundamental disagreement over water rights, water disputes are resolved using other instruments of national power. Military power, or at least the threat of military action, is often a decisive factor. For example, Turkey, being upstream from but also stronger than Syria, holds to the position of "absolute state sovereignty." While Syria disagrees, their instruments of national power are insufficient to affect Turkey's position. It is important to note a like effect when the downstream nation is stronger. For example, the Arab states adamantly opposed Israel's plan to pipeline water from Lake Kinneret (also known as the Sea of Galilee) to the Negev Desert and discussed it

[20] Butts, "The Strategic Importance of Water," 74.
[21] Ibid.

as an agenda item at the 1964 Arab Summit. However, the relative military power of Israel and the Arab states forced an Arab admission that "they were not strong enough to thwart the Israeli plan by military force." [22]

It is important to note that the two divergent positions on riparian rights do not preclude bilateral or multilateral agreements over water. In fact, most water disputes are settled in this fashion.[23] However, in the cases discussed below, national power applied by the stronger states allows enforcement of de facto unilateral agreements.

Could Desalinization be a Means to Avoid Conflict?

A meaningful discussion of desalinization is beyond the scope of this paper. However, a brief discussion of desalinization is required.

Desalinization on a large scale requires money, technology, and energy. It is an effective option in places with an abundance of all three such as Saudi Arabia or Kuwait.[24] However, desalinization is currently too expensive a process to be viable in most instances. For example, desalinated water for Israel is projected to cost approximately four times that of water that might be obtained from constructing a Turkish pipeline and nine times the cost of current water sources.[25] Additionally, desalinization plants are extremely vulnerable operational or strategic targets as well as being sensitive to degradation in environmental conditions.[26]

[22] Shapland, *Rivers of Discord: International Water Disputes in the Middle East,* 16.
[23] Butts, "The Strategic Importance of Water," 74.
[24] Ibid., 68.
[25] Abi-Aadi and Grenon, *Instability and Conflict in the Middle East: People, Petroleum, and Security Threats,* 147. Costales, "Water Conflict in the Jordan River Basin: What Should Strategists Ask?" 9.
[26] Kandil, "The Water Conflict in the Middle East," 12.

While any additional source could lessen water's potential to trigger violence, the combination of cost and vulnerability prevent desalinization from being a viable option to prevent conflict.

First of all, see to it that you are always positioned upstream and your enemies downstream.
American Indian Proverb.

Turkey, Syria, Iraq, and Water as a Weapon

The waters of the Tigris and Euphrates Rivers have been essential for centuries to the region now comprised of Turkey, Syria, and Iraq. Both the Tigris and Euphrates Rivers' headwaters are in the Turkish mountains. The Tigris River forms a small portion of the Turkish-Syrian border but otherwise flows from Turkey though Iraq and empties into the Persian Gulf through the *Shatt al Arab*. The Euphrates River flows from Turkey to Syria and then to Iraq where it joins with the Tigris at the *Shatt al Arab*. While Syria and Iraq have other minor water sources, they pale in comparison to these two rivers with 66 percent of Syria's surface water and 79 percent of Iraq's surface water originating outside their borders.[27]

Not surprisingly, as the upstream nation, Turkey holds to the position of "absolute state sovereignty" as evidenced by the Prime Minister's remarks in 1996 that, "Neither Syria nor Iraq can lay claim to Turkey's rivers any more than Ankara could claim their oil. This is a matter of sovereignty. We have a right to do anything we like."[28] Turkey's actions consistently demonstrate this viewpoint with the most visible action being the Grand Anatolia Project (GAP), a social and infrastructure umbrella program similar to the

[27] Nichiporuk, *The Security Dynamics of Demographic Factors*, 24.
[28] Abi-Aadi and Grenon, *Instability and Conflict in the Middle East: People, Petroleum, and Security Threats*, 145.

Tennessee Valley Authority. Despite Syrian and Iraqi objections, Turkey constructed 22 dams and 25 irrigation projects using the headwaters of the Tigris and Euphrates Rivers.[29] For this discussion's purpose, a key element of the GAP is enabling Turkey's control of these rivers' flow as best described by the site supervisor of the Ataturk dam when he bluntly said, "Water is a weapon … in order to regulate the Arab's political behavior."[30] However, Turkey's use of water as weapon has moved past just rhetoric.

Turkey's greatest security threat in its southeastern quadrant is the insurgent Kurdistan Workers Party, better known as the PKK. The GAP helps provide a positive economic environment assisting Turkey's internal counterinsurgency efforts.[31] However, Turkey had difficulty dealing with PKK members crossing into Turkey from Syria and Iraq. Part of Syria's support for the PKK enabling these cross-border operations focused on using the PKK as a counter to Turkey's control of the Euphrates River. Turkey responded by cutting the river's flow and forcing Syria to end active support for the PKK.[32]

For the operational planner, a key observation is that with a system of dams, an upstream state can use resource water as a part of factor force to compel a downstream state towards an objective. However, it is important to recognize that there are finite limits, both in time and in overall force, on such use of water as a weapon. Withholding water by restricting the flow reduces hydroelectric power generated by the upstream state, creating an opportunity cost. Additionally, a system of dams, even one as extensive as the GAP, has a finite holding capacity. Once that capacity is reached, the flow must be returned to a higher

[29] Butts, "The Strategic Importance of Water," 75.
[30] Costales, "Water Conflict in the Jordan River Basin: What Should Strategists Ask?" 6.
[31] Alqallaf, "Water Resources and Security Issues in the Middle East: The Next Arena of Future Conflicts," 12.
[32] Kandil, "The Water Conflict in the Middle East," 17.

level.[33] Factor time may not be sufficient to force the downstream state's compliance before the flow must be increased. Moreover, withholding water as a weapon may be inconsistent with the law of war principles of distinction and proportionality. Even Turkey, despite their demonstrated use of water as a weapon and continuing threat of repeated use, appears to recognize these principles as evidenced by their public announcement that water would not be used as a weapon against Iraq in the 1990-1991 Gulf War.[34]

There are two final considerations for the operational planner when examining the above. First, the supporting infrastructure, the dams and irrigation projects like those of the GAP, are not easily destroyed by limited attacks. Second, an attack large enough to destroy dams and irrigation projects is also "likely to have unacceptable political and economic consequences, and carries high risks of conflict escalation."[35]

Many of the wars of this century were about oil. But wars in the next century will be about water.

Ismail Serageldin, World Bank Vice President[36]

The Jordan River Valley and Its Importance

While water as a source of conflict has produced a significant amount of saber rattling between Turkey, Syria and Iraq, the nations of the Jordan River Valley – Israel, Syria, Jordan, Lebanon, and the Palestinian territories – have seen military action as a direct result of water resources as well as military action heavily influenced by water resources. The next "water war" is most likely to occur in this region.

[33] Shapland, *Rivers of Discord: International Water Disputes in the Middle East*, 134-135.
[34] Alqallaf, "Water Resources and Security Issues in the Middle East: The Next Arena of Future Conflicts," 14.
[35] Ibid., 21, 20.
[36] Butts, "The Strategic Importance of Water," 65.

Where is the Water in the Jordan River Valley?

Understanding water as source of conflict in the Jordan River Valley and surrounding states first requires a brief discussion of water sources and national boundaries as a part of factor space.[37] Israel occupies the central position. As such, much of the following description will be in relation to Israeli territory.

Figure 1. Water Sources for Israel

Reprinted from the Jewish Virtual Library

The Jordan River, flowing north to south, is geographically the lowest river in the world resulting in salinity being a significant problem. Salinity below Lake Kinneret, becomes especially problematic as the Jordan's waters continue until reaching the Dead Sea. The Jordan River is also relatively small, having approximately two percent of the Nile River's annual flow or seven percent of the Euphrates River's flow. The Jordan's headwaters originate in Lebanon and Syria with the Golan Heights being an important area.

[37] Figure 1 reprinted from Jewish Virtual Library, "Water Map." http://www.jewishvirtuallibrary.org/jsource/images/maps/watermap.gif (accessed 14 March 2008).

The Litani River is fully contained within Lebanon but is close enough to the Israeli border to be important to this discussion. The Litani is also important as it is the only fresh water source in the region that is currently underutilized.[38]

Aquifers in the region include the West Bank's Mountain Yarqon-Taninim Aquifer (flowing as depicted on Figure 1) the Israeli coastal Crystal Plains Aquifer and an aquifer running from east to west under the Gaza Strip.[39]

Of particular note, as it is a physical manifestation of Israeli water policy, is the massive system of pipelines known as the National Water Carrier (NWC). This system pumps tremendous quantities of water from Lake Kinneret southwards throughout Israel including the most remote portions of the Negev Desert.

Israel's Thirst

With Israel occupying the central position, as well as being the proverbial 500-pound gorilla, discussing water as a source of conflict in this region is best done by examining Israel's actions and policies towards water rights and water use.

In order to establish and develop a viable and credible state for Jews, Zionists understood that they would have to link people to the land.[40] Reestablishing Jews as people-of-the-land and not just as city dwellers amid other cultures requires agriculture. Agriculture requires water. Even before Israel's establishment, Zionists "lobbied for borders that would include the Jordan and Yarmouk Rivers as well as much of the lower Litani."[41] Moreover, in 1919, as the British and French set up boundaries under the League of Nations mandate, the

[38] Kiser, *Water: The Hydraulic Parameter of Conflict in the Middle East and North Africa*, 7.
[39] Butts, "The Strategic Importance of Water," 76, 77.
[40] Shapland, *Rivers of Discord: International Water Disputes in the Middle East*, 5.
[41] Kandil, "The Water Conflict in the Middle East," 15.

World Zionist Organization pressed further by issuing a statement declaring it was "of vital importance not only to secure all water sources already feeding the country, but also to be able to conserve and control them at their sources." [42] In other words, Israel would not be secure simply as a downstream state. Israel sought an upstream position; though the original borders did not achieve this end.

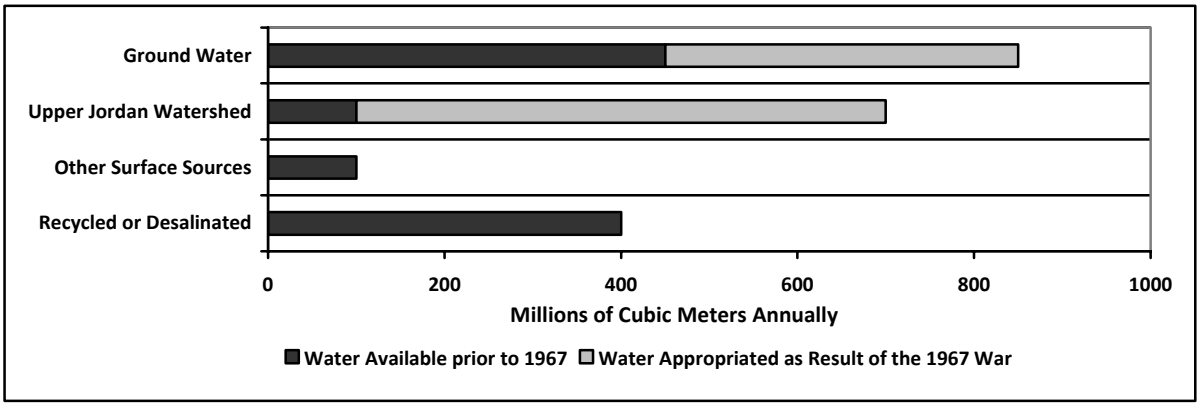
In the 1950's, the start of the NWC created significant tension between Israel and the surrounding Arab nations. In 1951, as an NWC project to create an agricultural area, Israel began draining the Huleh Swamp upstream from Lake Kinneret. Syrian forces attacked the Israeli workers.[43] In 1959, Israel announced intentions to use the NWC to divert Jordan River waters all the way to the Negev Desert. The Arab League responded by attempting to divert the headwaters of the Jordan River. Israel's counter-response in 1964 was to shell and destroy the resulting Syrian-Jordanian waterworks.[44] Israel conducted similar military actions in 1965 destroying three Lebanese reservoirs that were diverting significant water from the Jordan River.[45]

When viewed in context, these actions build a strong argument that securing water resources was an Israeli objective during the 1967 War. (Admittedly, the complexity of Arab-Israeli relations does not allow any factor to be examined in isolation.) Seizing the Golan Heights, which certainly has other strategic importance, gave Israel control of the entire perimeter of Lake Kinneret. Coupled with the West Bank and the Gaza Strip, Israel thus gained control of much of the territory originally lobbied for by the World Zionist Organization and left Israel as the de facto upstream state for the Jordan River as well as the

[42] Shapland, *Rivers of Discord: International Water Disputes in the Middle East*, 7.
[43] Shaheen, "Questioning the Water-War Phenomenon in the Jordan Basin," 139.
[44] Ibid.
[45] Kiser, *Water: The Hydraulic Parameter of Conflict in the Middle East and North Africa*, 5.

West Bank's aquifer.[46] Even if water was not a planning consideration for the 1967 War, water is absolutely a consideration in the continuing status of the territories seized as demonstrated by Table 2.[47]

Table 2. Significance of Water Captured by Israel in 1967 War



Adapted from Kiser

Kiser asserts, "Of the approximately 1950 million m^3 of water Israel uses annually, roughly 950, or 48 percent, comes from territory Israel captured during the 1967 War."[48] Israel cannot, from a hydrological standpoint, relinquish control of these territories as there are simple no viable substitute water sources. With water at least a post-conflict factor to the 1967 War, there is similar speculation that part of Israel's objectives in their 1982 invasion of Lebanon was to gain control of the Litani River and divert a portion of its waters.[49] However, actions, or rather a lack of actions, weaken this speculation as Israel did not undertake any observed attempt to divert the Litani.

Even without attempting to gain direct access to the waters of the Litani River, Israel has threatened military action in Lebanon as recently as 2002 in order to protect other water

[46] Kandil, "The Water Conflict in the Middle East," 6, 15.
[47] Kiser, *Water: The Hydraulic Parameter of Conflict in the Middle East and North Africa*, 29.
[48] Ibid., 22.
[49] Ibid., 8.

resources.[50] Lebanon announced plans to divert water from a set of springs feeding the Jordan River. Despite the amount of water being diverted being within the never ratified but generally accepted levels of the 1955 U.S. sponsored Johnston Agreement, Ariel Sharon stated the pumping stations being constructed were a cause for war. However, it is again worth noting that water as an objective is difficult to isolate amid the larger Israel-Hezbollah-Lebanon conflict.[51]

The Gaza Strip is an exception where Israel gains no hydrological advantage from occupied territories. Israel does not draw heavily on the aquifer moving underneath the Strip and does not see any value to doing so in the future.[52] However, this position is not based on charitably sharing water resources but rather on this aquifer being of low value and growing lower. Exploitation of this aquifer, primarily by Palestinians, averages 140 million m^3 annually but the aquifer recharges with only 60 million m^3.[53] Adding insult to injury, overdrawing this aquifer has lowered the water table and allowed seawater to enter. The increasing salinity threatens to make the remaining water unusable.

Israel's Crystal Plains Aquifer suffers from similar conditions and increasing salinity. Israel has artificially recharged the Crystal Plains Aquifer using water from Lake Kinneret through the NWC.[54] Though it could, Israel has not done the same for the Gaza Aquifer. In this case, it appears Israel is withholding water as an economic weapon preventing expansion of the Palestinian population in the Gaza Strip – primarily by discouraging immigration of the estimated two million Palestinians who live outside the Middle East.[55]

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[50] Blandford, "A Lebanese-Israeli Water Conflict Threatens to Boil Over."
[51] Ibid.
[52] Shapland, *Rivers of Discord: International Water Disputes in the Middle East*, 25.
[53] Kiser, *Water: The Hydraulic Parameter of Conflict in the Middle East and North Africa*, 16.
[54] Shapland, *Rivers of Discord: International Water Disputes in the Middle East*, 26.
[55] Kiser, *Water: The Hydraulic Parameter of Conflict in the Middle East and North Africa*, 27, 33.

When the discussion above is coupled with two additional factors, it becomes even clearer that Israel actively uses water as an element or weapon of national power, at least as part of the economic instrument if not as a direct proxy for military action. The first of these factors is the massive water subsidies given to Israeli agriculture as part of the related policies to be self-sufficient in food production and to tie Israelis' national identity to the land through agriculture – there are even heavy subsidies to water-intensive crops such as cotton and citrus which have an especially low economic return for the water consumed.

The second of these factors is a policy restricting Palestinian wells in the West Bank but allowing unrestricted Israeli wells.[56] With water such a vital commodity for both agriculture and industry, this policy inhibits Palestinian economic development and carries the second-order effect of inhibiting Palestinian immigration to the West Bank. The resulting tension, much like in the Gaza Strip, is another element adding volatility and the likelihood of violent conflict to an already precarious situation.

Why Does Water Matter?

> At the outset of planning, a crucial planning component is the development of a comprehensive situation assessment or diagnosis that places a premium on developing an in-depth knowledge of the underlying causes and dynamics of the conflict and the relevant aspects of a society's local culture as well as its political, military, and economic systems. In particular, understanding the drivers of instability and/or conflict should be a first phase of the planning process.[57]

While the Joint Operating Concept quoted above is specifically targeted at stabilization, security, transition, and reconstruction operations, it is applicable across the full range of military operations. Vego expands this idea by asserting that policy, strategy, and

[56] Kiser, *Water: The Hydraulic Parameter of Conflict in the Middle East and North Africa*, 11.
[57] Joint Forces Command, *Military Support to Stabilization, Security, Transition, and Reconstruction Operations: Joint Operating Concept*, 30.

operational art have a mutually-influencing relationship.[58] If operational planners are to effectively link policy and strategy objectives to tactical actions, they must clearly understand those policy and strategy objectives – both their own objectives as well as the (potential) enemy's objectives. Natural resources are important considerations in states' policy and strategy objectives. As demonstrated, water, because of its inherent nature as a vital resource without substitute amplified by localized water scarcity, becomes a unique and powerfully significant consideration driving policy and strategy which, in turn, drives operational considerations. Operational planners must understand how water as a resource affects political and military decision making in order to accurately and effectively assess objectives and actions as part of operational planning.

[58] Vego, *Joint Operational Warfare: Theory and Practice*, I-35.

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